UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 24514

MSAS NO. 109

OVER THE

SHELL ROCK CHANNEL

DISTRICT 6 - FREEBORN COUNTY, CITY OF ALBERT LEA

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 142)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 24514, the East and West Abutments and Piers 1 and 2, were found to be in good to fair condition. The concrete abutments were in good condition with no structurally significant defects observed. However, the concrete encasements on the steel piles at the piers were heavily deteriorated and exhibited areas of section loss and exposed steel reinforcing. The steel H-piles were generally in satisfactory condition below the waterline and exhibited coating failure and moderate surface corrosion. The channel bottom appeared stable with no changes of concern since the previous inspection, although there was some aggredation of bottom material throughout the channel.

INSPECTION FINDINGS:

(A) The concrete encasements on the steel piles at the piers exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from 10 inches above to 3 feet below the waterline.

(B) The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion and up to 1/4-inch-diameter rust nodules, but with no appreciable loss of section.

(C) A welded splice on the upstream steel H-pile of Pier 2 was observed 7.5 feet below the waterline and was in good condition.

(D) An area of section loss, 2 feet high by 2 feet wide, was observed above the waterline on the West Abutment with up to 1 inch of penetration.

RECOMMENDATIONS:

(A) To prevent further deterioration of the concrete encasements of the steel H-piles, it is recommended that the reinforcing steel be cleaned and the areas of section loss be patched with a grout mix with high durability and low permeability. It should be noted that the repair of the encasements would be for cosmetic and pile protection reasons, and that overall pier integrity has yet to be adversely affected by the encasement problems.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 24514

Feature Crossed: The Shell Rock Channel

Feature Carried: MSAS No. 109

Location: District 6 - Freeborn County, City of Albert Lea

Bridge Description: The bridge consists of three spans of precast concrete double-tees. The superstructure is supported by two reinforced concrete abutments and two steel H-pile bents. The abutments are supported by footings on steel H-piles. The bents are labeled Piers 1 and 2 from the westerly direction.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: November 2, 2002

Weather Conditions: Sunny, "35EF

Underwater Visibility: "2 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments and Piers 1 and 2.

General Shape: The abutments each consist of a reinforced concrete breastwall and two perpendicular reinforced concrete wingwalls and are founded on steel H-pile supported footings. The piers consist of a single line of 10 steel H-plies each. The upper portions of the steel H-piles are encased in a concrete encasement cylinder below the pile cap.

Maximum Water Depth at Substructure Inspected: Approximately 14 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap on the north end of Pier 1.

Water Surface: The waterline was approximately 7.9 feet below reference.
Waterline Elevation = 62.4

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

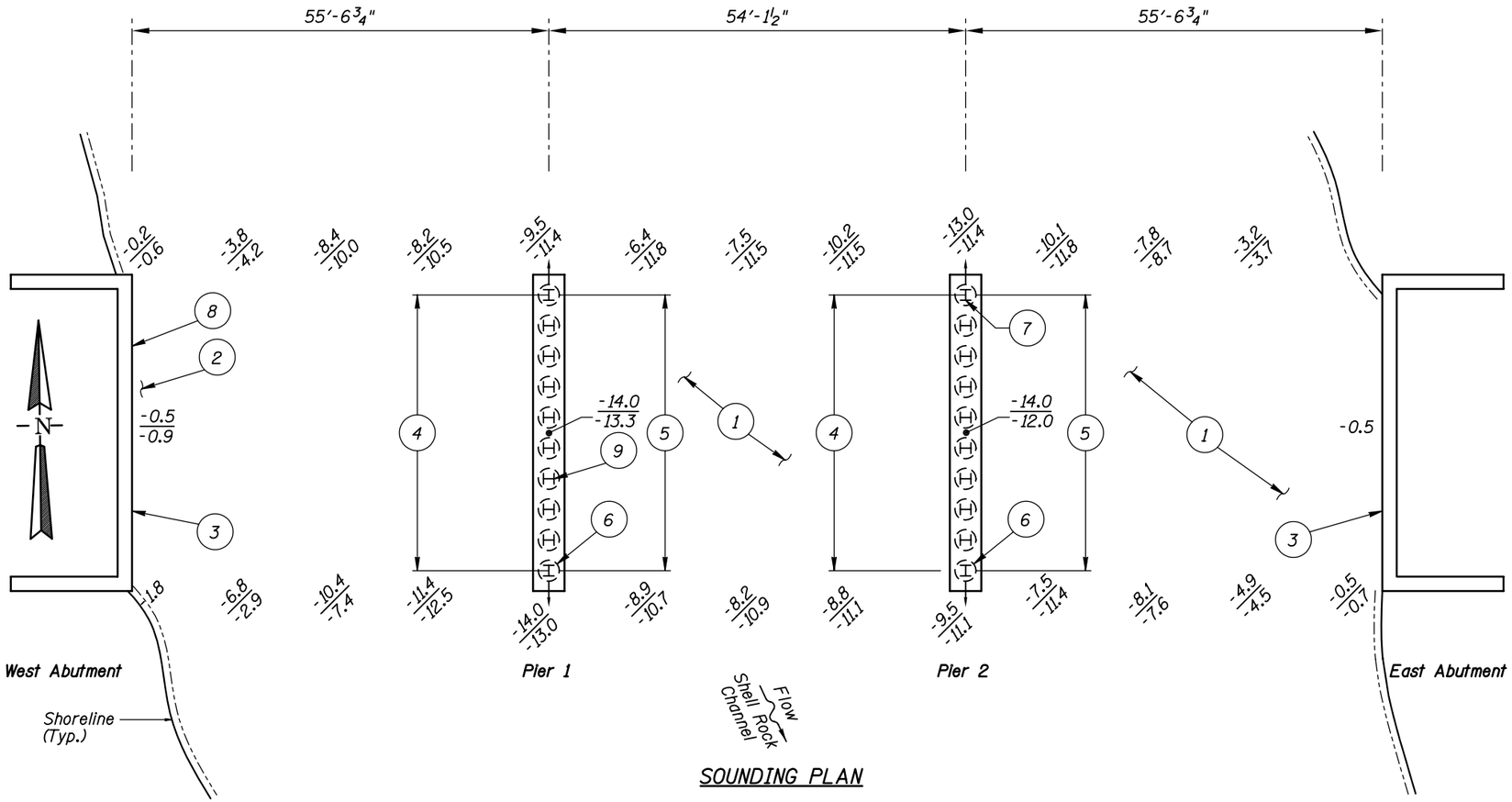
Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/11/02

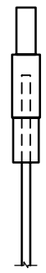
Item 113: Scour Critical Bridges: Code I/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____Yes ___X__ No



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. The East and West Abutments, and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on November 2, 2002, the waterline was located approximately 7.9 feet below the top of the pier cap at the upstream end of Pier 1. This corresponds with a waterline elevation of 62.4 based on the previous report dated September 28, 1997.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.

(2) The channel bottom consisted of cobbles and rocks up to 2 feet in diameter.

(3) Overall, the concrete abutments were in good and sound condition with no structurally significant defects observed.

(4) The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion with up to 1/4-inch-diameter rust nodules.

(5) The concrete encasements exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from 10 inches above to 3 feet below the waterline.

(6) Timber and steel formwork was still in place.

(7) A weld-splice of steel H-pile was observed 7.5 feet below the waterline and was in good condition.

(8) An area of section loss, 2 feet high by 2 feet wide, was observed above the waterline with up to 1 inch of penetration.

(9) Reinforcing steel was wrapped around the upper portion of the pile.

Legend

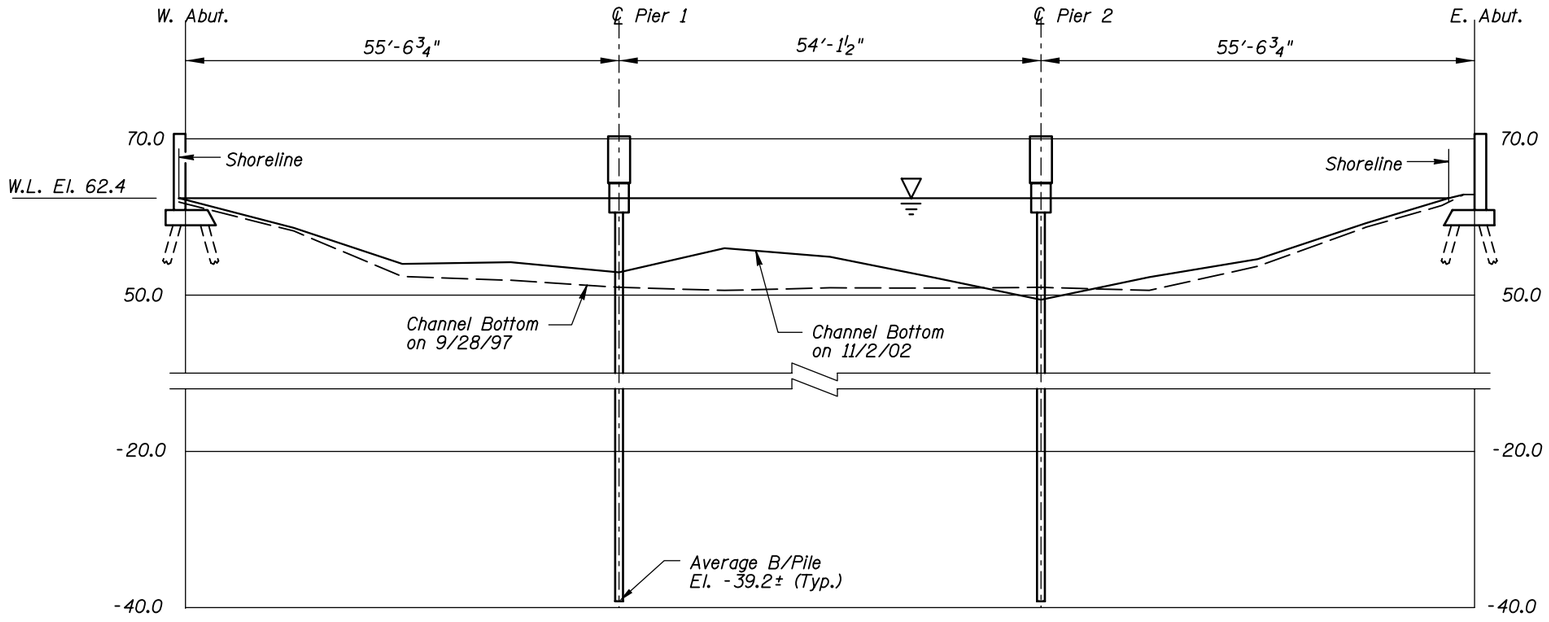
-2.0 / -5.2	Sounding Depth from Waterline (11/2/02) / Sounding Depth from Waterline (9/28/97)
H	Steel H-Pile
	Battered Steel H-Pile

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

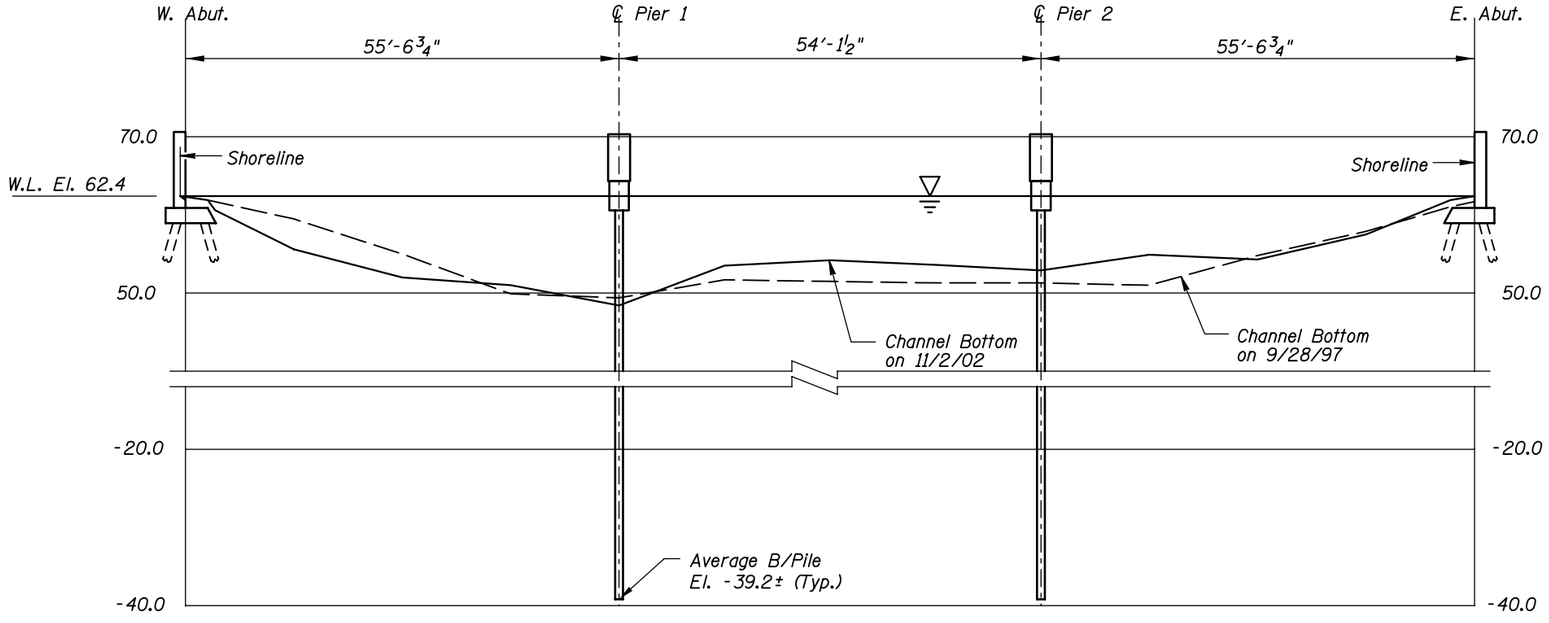
STRUCTURE NO. 24514
OVER THE SHELL ROCK CHANNEL
DISTRICT 6, FREEBORN COUNTY, CITY OF ALBERT LEA

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: NOV. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120142		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: NOV. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=20'
Code: 35120142		Figure No.: 2

Photograph 1. Overall View of the Structure, Looking Northwest.

Photograph 2. View of Pier 1, Looking Southeast.

Photograph 3. View of Pier 2, Looking Southwest.

Photograph 4. View of the Typical Concrete Pile Encasement Condition.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: November 2, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 24514 WEATHER: Sunny, "35EF
WATERWAY CROSSED: The Shell Rock Channel
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, U/W Light, Sounding Pole, Lead Line, Probe Rod, Camera, Scraper

TIME IN WATER: 2:55 p.m.
TIME OUT OF WATER: 3:20 p.m.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY "2 feet
DEPTH 14.0 feet maximum at Piers 1 and 2
ELEMENTS INSPECTED: The East and West Abutments and Piers 1 and 2
REMARKS: The concrete of the abutments was in good condition with no structurally significant defects observed. The concrete encasements on the H-piles of the piers exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from 10 inches above to 3 feet below the waterline. The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion with up to 1/4-inch-diameter rust nodules, but with no appreciable loss of section. The channel bottom appeared stable with no significant scour and some aggredation since the last inspection.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

To prevent further deterioration of the concrete encasements of the steel H-piles, it is recommended that the reinforcing steel be cleaned and the areas of section loss be patched with a grout mix with high durability and low permeability.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 24514
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Shell Rock Channel

INSPECTION DATE November 2, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	West Abutment	1.8’	N	7	N	9	N	7	8	8	8	N	8	7	N	N	8	N	N
	Pier 1	14.0’	7	5	N	9	N	6	8	N	N	N	8	5	7	N	6	N	N
	Pier 2	14.0’	7	5	N	9	N	6	8	N	N	N	8	5	7	N	6	7	N
	East Abutment	0.5’	N	7	N	9	N	7	8	8	8	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The concrete of the abutments was in good condition with no structurally significant defects observed. The concrete encasements on the H-piles of the piers exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from 10 inches above to 3 feet below the waterline. The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion with up to 1/4-inch-diameter rust nodules, but with no appreciable loss of section. The channel bottom appeared stable with no significant scour and some aggredation since the last inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.